

Standard C-5: The student will demonstrate an understanding of the structure and behavior of the different phases of matter.

Supporting Content Web Sites

SparkNotes

<http://www.sparknotes.com/chemistry/>

This website contains concise descriptions of chemistry principles. Also includes sample problems.

All C-5 indicators

Science Line

http://www.wpbschoolhouse.btinternet.co.uk/page03/3_52states/3_52statesQ.htm ,

http://www.wpbschoolhouse.btinternet.co.uk/page03/3_51energy/3_51energyQ.htm

Multiple choice questions on solids, liquids and gases.

C-5.2, C-5.4, C-5.5

Homework High

<http://www.channel4.com/learning/microsites/H/homeworkhigh/science/index.jsp>

This website provides answers to general physics questions.

All indicators for C-5

American Chemical Society, chemistry.org

http://center.acs.org/education/olympiad/2003/practice_test/index.html

On-line practice tests on states of matter and other chemistry subjects.

All indicators for C-5

ChemTeam

<http://dbhs.wvusd.k12.ca.us/webdocs/ChemTeamIndex.html>

The ChemTeam provides study resources in all standard topics for students in high school and Advanced Placement chemistry.

All indicators for C-5

Rader's CHEM4KIDS

<http://www.chem4kids.com/>

This website provides students with supporting material for most general chemistry topics. It is well organized and easy to follow.

All indicators for C-5

Visualization and Problem Solving for General Chemistry (Purdue University)

<http://www.chem.purdue.edu/gchelp/>

This website contains very clear descriptions of chemistry topics.

All indicators for C-5

Gas Laws An Internet WebQuest on Chemistry

<http://www.kn.att.com/wired/fil/pages/webchemistrga.html>

This is a WebQuest that takes students through gas law calculations and theory.
C-5.2, C-5.3, C-5.7

Virtual ChemBook

<http://www.elmhurst.edu/%7Eechm/vchembook/index.html>

This site has very clear explanations of most general chemistry topics.
All indicators for C-5

Advanced Placement Digital Library (Rice University)

<http://apdl.rice.edu/DesktopDefault.aspx?tabindex=4&tabid=34>

This site provides excellent resources for all general chemistry topics. There are activities, tutorials, videos, virtual and real labs, and so much more.
All indicators for C-5

Suggested Literature

Sacks, Oliver. (2002). *Uncle Tungsten: Memories of a Chemical Boyhood*. New York: Vintage.

ISBN: 0375704043

Oliver Sacks uses stories of his childhood to describe applications of chemistry and the history of chemistry. There are many applications of the concept of gases, chemical processes, and energy changes.

C-5.2, C-5.4, C-5.5, C-5.8, C-5.9

Schwarcz, Dr. Joe. (2002). *The Genie in the Bottle: 67 All-New Commentaries on the Fascinating Chemistry of Everyday Life*. Ontario: Owl Books.

ISBN: 0805071385

Dr. Schwarcz uses really-life examples to describe applications of chemistry. The focus is mainly on food and health sciences. There are many applications of phases of matter, energy changes, and chemical processes.

C-5.2, C-5.4, C-5.5, C-5.8, C-5.9

Burreson, Jay and Couteur, Penny Le. (2004) *Napoleon's Buttons* (pb reprint). New York: Tarcher.

ISBN: 1585423319

Napoleon's Buttons is the fascinating account of seventeen groups of molecules that have greatly influenced the course of history. There are many applications of phases of matter, energy changes, and chemical processes.

C-5.2, C-5.4, C-5.5, C-5.8, C-5.9

Gonick, Larry. (2005) *The Cartoon Guide to Chemistry*. New York: Collins.

ISBN: 0060936770

This book is a refreshingly humorous but thorough ancillary guide to general chemistry. It covers all areas of general chemistry.

All indicators for C-5

Wertheim, Jane. (2000). *Illustrated Dictionary of Chemistry*. London:Usborne Books.
ISBN: 0746037945
Excellent resource book for all topics in general chemistry.
All indicators for C-5

Houk, Clifford C., and Post, Richard. (1996). *Chemistry: Concepts and Problems: A Self-Teaching Guide*. New Jersey: Wiley.
ISBN: 0471121207
This book has easy to follow examples and explanations of chemistry principles. It covers all general chemistry topics.
All indicators for C-5

Moore, John T. (2002). *Chemistry For Dummies*. New Jersey: For Dummies.
ISBN: 0764554301
This book has easy to follow examples and explanations of all general chemistry topics.
All indicators for C-5

Asimov, Isaac. (1979). *A Short History of Chemistry*. Westport, CT:Greenwood Press Reprint.
ISBN: 0313207690
From the use of metals by prehistoric man to the alchemical experiments of medieval and Renaissance man to the complex chemical skills of contemporary man, Asimov traces the development of this building block of our technological world. This book incorporates knowledge of chemical processes, phases of matter, density, and energy changes.
C-5.1, C-5.5, C-5.6, C-5.9

Cobb, Cathy, and Fetterolf, Monty L. (2005). *The Joy of Chemistry: The Amazing Science of Familiar Things*. New York:Prometheus Books.
ISBN: 1591022312
This book uses real-life examples to explain the science of chemistry. Most general chemistry topics are covered.
All indicators for C-5

Williams, Linda. (2003). *Chemistry Demystified*. New York:McGraw-Hill Professional.
ISBN: 0071410112
This book supports the learning of most general chemistry topics. It uses a step-by-step method to help students understand concepts.
All indicators for C-5

Suggested Steamline Video Resources

Elements of Chemistry: Gases, Liquids, and Solids

All segments

ETV Streamline SC

This program reviews the different gas laws as well as examining the characteristics of substances and elements when they are liquids and solids.

All segments are applicable. 20 minute video.

C-5.1, C-5.2, C-5.3, C-5.7

Physical Science Series: Phases of Matter

All segments

ETV Streamline SC

Through interesting visual examples of the many uses of water, students learn about viscosity, elasticity, solids, liquids, gases, phase changes, Boyle's Law, Charles' Law, vaporization, sublimation, melting, freezing, and condensation, as well as many other concepts.

All segments are applicable. 18 minute video.

C-5.2, C-5.3, C-5.4, C-5.5, C-5.7

Chemistry Connections: Kinetic and Potential Energy Changes During Changes to States of Matter

All segments

ETV Streamline SC

Examples and graphs that illustrate energy changes during phase changes.

All segments are applicable. 29 minute video.

C-5.4, C-5.5

Chemistry Connections: The Enthalpy of Phase Changes

All segments

ETV Streamline SC

Examples and graphs that illustrate energy changes during phase changes. The molar enthalpies for condensation and fusion of water are determined calorimetrically, and various enthalpy change problems are solved

All segments are applicable. 29 minute video.

C-5.4, C-5.5

Common Properties of Matter: Atoms, Elements, and States

A Closer Look at the States of Matter (04:35) (segment 4)

States of Matter (03:10) (segment 5)

ETV Streamline SC

Video gives a description of the states of matter, as well as discussing density of matter.

A Closer Look at the States of Matter (04:35) (segment 4)

States of Matter (03:10) (segment 5)

C-5.1

Simply Science: Water's Physical Properties

All segments

ETV Streamline SC

Properties of water are discussed and demonstrated. Also shows how phase changes occur. 5. All segments are applicable. 27 minute video.

C-5.1, C-5.4, C-5.5

Simply Science: Water's Structure

The Shape of Water (03:28) (segment 4)

ETV Streamline SC

Video describes the shape of a water molecules and describes the intermolecular forces between water molecules.

The Shape of Water (03:28) (segment 4)

C-5.1

Magic School Bus Goes on Air, The

All segments

ETV Streamline SC

Mrs. Frizzle and her students learn about all about air, including how air behaves (as a gas).

All segments are applicable. 27 minute video.

C-5.2

Chemistry Connections: Quantitative Analysis Using Redox Titration

All segments

ETV Streamline SC

Students learn about redox reactions and use a redox titration to quantitatively analyze a sample.

All segments are applicable. 29 minute video.

C-5.8

Biology of Water, The: Water: A Miraculous Substance (The Properties of Water and the Development of Life)

Water: General Physical and Chemical Properties (06:38) Segment 2

Heat Capacity: Climatic Effects (00:48) Segment 3

Latent Heat: Changes of State and Heat Effects (01:23) Segment 4

ETV Streamline SC

This program examines the unique physical and chemical properties of water, including molecular structure, solvent capabilities, changes of physical state, surface tension, heat capacity, and latent heat.

Water: General Physical and Chemical Properties (06:38) Segment 2

Heat Capacity: Climatic Effects (00:48) Segment 3

Latent Heat: Changes of State and Heat Effects (01:23) Segment 4

C-5.1, C-5.5

Physical Science: States of Matter

All segments

ETV Streamline SC

Video uses clear examples of each state of matter. Also addresses properties of each state.

All segments are applicable. 20 minute video.

C-5.1, C-5.2, C-5.5, C-5.7

Career Connections**HVAC technician**

HVAC technicians install and maintain heating and air conditioning systems. There is an obvious need for this career, especially here in the South. HVAC technicians go through training that can take up to two years. They must understand concepts of gases, energy changes, phase changes, and gas pressure.

Chemical engineer

Chemical engineers can specialize in many areas. If they work in an industrial setting, they would need to know about gases, their properties, and the effects of high and low pressure on gases. They would also have to know about phase and energy changes.

Quality control technician

Quality control technicians often work in industrial or consumer settings. Their job is to analyze products before the product is shipped to the consumer. They will test for product purity, density, and overall quality.

Meteorologist

Meteorologists analyze atmospheric air patterns to help predict the weather. They must understand the properties of gases and pressure. They must also understand the interrelated effects of temperature, pressure, and energy changes.